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CYTOGENETIC COMPARISON OF THREE CONTROL POPULATIONS AS MEASURED BY CHROMOSOME PAINTING.

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To quantify the effects of adverse exposure, it is important that the baseline frequency of stable aberrations be well established. It is also important to understand how control populations in different demographic areas vary in their aberration frequencies. Recently we used chromosome painting to show that translocations accumulate with age and cigarette smoking. Here we compare three control populations, one each from Minnesota, California, and Russia, for aberration frequencies as measured by whole chromosome painting of chromosomes 1, 2 and 4. All subjects were healthy individuals who had not been occupationally or accidentally exposed to radiation or chemicals, and who had not received chemo-or radio-therapy. Data from the three populations were combined and fit to a series of models that regressed a transformed value of stable translocations on sample origin, age, and smoking status. While there was some evidence ($p = 0.20$) that the effect on translocation frequencies from smoking was different in the three populations, the best fitting model included a common response across the three samples to age and smoking status. The mean response, adjusting for age and smoking status, differed in the three populations ($p = 0.025$), with an approximately 30% difference in translocation frequencies between the California and Minnesota samples ($p = 0.015$). The difference between the American populations may be explained by the experimental protocols used. In the California (and Russian) populations, the cells were cultured for 52 hours, but in the Minnesota population study the cells were grown for 72 hours. Whether this difference is responsible for the variation in translocation frequencies is unknown, but should be explored further. This work was performed in part under the auspices of the US DOE by LLNL under contract No. W-7405-ENG-48.